

STATEMENT OF THE CLAIMS

1) (currently amended) A ~~semiconductor emitter/detector~~ optical device comprising:

a semiconductor ~~single~~ substrate arranged for emitting light for incidence on an ~~a~~ ~~sample or other~~ element and also responsive to light received from said ~~sample or other~~ element, ~~the device further comprising; and~~

means for monitoring a characteristic of the device which varies in dependence upon said light received from said ~~sample or other~~ element;

wherein the device includes a resonant cavity light emitting element integrated as part of said substrate, comprising a reflector through which light is emitted, the reflector comprising a plurality of alternating layers of high and low refractive index material, a layer of absorbing material being incorporated into or associated with said reflector, said absorbing layer serving to absorb light of a wavelength different from the light emitted by the light emitting element.

2) (original) A device as claimed in claim 1, arranged such that said received light affects an electrical property thereof and so alters its current-voltage characteristic, said monitoring means being arranged to monitor said current-voltage characteristic.

3) (withdrawn) A device as claimed in claim 1, comprising a light emitter element and a photodetector element, both integrated on said substrate.

4) (withdrawn) A device as claimed in claim 3, in which said light emitter element comprises a resonant cavity element.

5) (withdrawn) A device as claimed in claim 3, in which said photodetector element is arranged to detect light of a different wavelength from the light emitted by said light emitter element.

6) (withdrawn) A device as claimed in claim 5, in which said photodetector element is arranged to respond preferentially to said different-wavelength light and is relatively non-responsive to light of the wavelength emitted by said light emitter element.

7) (withdrawn) A device as claimed in claim 6, in which said photodetector element is provided with a wavelength-selective filter layer, at or adjacent its light-receiving surface.

8) (withdrawn) A device as claimed in claim 7, in which said photodetector element comprises a resonant cavity and said filter layer is provided in an upper reflector of said photodetector element.

9) (withdrawn) A device as claimed in claim 8, in which said semiconductor substrate comprises said resonant cavity between upper and lower reflectors, a region of said upper reflector being removed to form said emitter element, another region of said substrate

forming said photodetector element and including said filter layer in its said upper reflector.

10) (withdrawn) A device as claimed in claim 3, in which said photodetector element comprises a diode arranged for a reverse bias applied to it to place said diode close to its breakdown point so that, in use, avalanche photo-detection occurs.

11) (cancelled)

12) (withdrawn) A device as claimed in claim 1, comprising a resonant cavity light emitting device, having a secondary optical cavity disposed over a light-emitting surface thereof, to form a coupled-cavity system, said secondary optical cavity including a chamber or flow duct for a sample.

13) (cancelled)

14) (currently amended) A device as claimed in claim 1 ~~11~~, in which said absorbing layer is disposed in an undoped semiconductor region of said substrate.

15) (currently amended) A device as claimed in claim 14, in which said absorbing layer is disposed between two groups of alternating high and low refractive index materials which form said reflector ~~through which said light of the device is emitted.~~

16) (currently amended) A device as claimed in claim 1, comprising an array of resonant cavity light emitting elements ~~emitter/detectors~~ integrated as part of ~~on a common~~ said substrate, each resonant cavity light emitting element having said reflector and said layer of absorbing material, said array of resonant cavity light emitting elements arranged to operate independently of each other and with said monitoring means arranged for monitoring a ~~said~~ characteristic of each given light emitting element ~~said emitter/detector~~ independently of the others.

17) (currently amended) A device as claimed in claim 16, in which said light emitting elements ~~emitter/detectors~~ are arranged in a linear array.

18) (currently amended) A device as claimed in claim 16, in which said light emitting elements ~~emitter/detectors~~ are arranged in a two-dimensional array.

19) - 24) (cancelled)

25) (currently amended) A device as claimed in claim 1 [[4]], in which said light emitting ~~emitter~~ element comprises one of a resonant cavity laser element and a resonant cavity LED element.